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Personnel

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FEBRUARY, 1929

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An Experiment in the Treatment of Colds *

By Dr. V. S. Cheyney, *Medical Director,*
Armour and Company

IT IS gratifying to hear Mr. Dietz recommend a form of health service in industry that I have advocated for twenty odd years. A friendly medical service for the employee and dependents; advisory and educational; placement of the physically handicapped; periodic examinations and cooperation with community agencies to improve community health conditions. Statistics show that only 2 per cent of all disease is industrial, directly, such as occupational diseases, or indirectly as influenced by working conditions. Eight per cent are communital, such as typhoid, contagious diseases, etc. Ninety per cent are individual, the result of some breach of the laws of hygiene. Ill health is very frequently the result of ignorance and the answer to that is education. The physician in industry through his unusual and frequent contacts with employees occupies a peculiarly advantageous position for the effective dissemination of health knowledge. Unusual opportunities are afforded the industrial physician for clinical observation and research. Colds, constipation, cancer, mongolian idiocy, mental defectives, epilepsy, immunity, anaphylaxis are some of the problems of medicine that we are studying in our industry.

The trend in industrial health service is towards preventive medicine and health education, thus aiding the employee to help himself. Health, good or bad, is still and always will be largely a matter of individual effort.

The scope of health activities rests entirely upon the management as the industrial physician is usually more than willing to direct any program that will lessen the morbidity of the employee and make him a better workman and a healthier, happier man.

I have been asked to discuss the treatment of colds based upon my personal investigation and experiments. What follows is largely an abstract of a paper read before the A.P.H.A. over a year ago in which I presented a new theory as to the cause of a cold and a new method of treatment based upon that theory.

In all industries absenteeism on account of sickness is a serious economic

*This and the three following papers were presented at the Autumn Convention of the A. M. A. held in Chicago, November, 1928.

problem. Respiratory diseases are the cause of over one-half of the time lost by employees and the common cold makes up fully one-half of the respiratory diseases. The layman uses the term "a cold" to cover a multitude of conditions; viz., an acute coryza or rhinitis; pharyngitis; laryngitis; bronchitis; la grippe; influenza; sinusitis and sometimes tonsillitis. The term "a cold" should be applied only to that condition which presents the following symptoms; dryness or irritation in the back of the throat; stuffiness in the nasal passages with increased secretion; slight headache; chilliness; watering of the eyes; sneezing; loss of appetite; muscle aches or pains in the legs and back and a general feeling of discomfort.

The accepted definition for a "common cold" has been "an acute infection of the nasal and pharyngeal regions, or of the upper respiratory tract." The first thing that I want to oppugn is that a cold is an infection. No one has been able to demonstrate that any one or any group of the many bacteria normally inhabiting the nasal, buccal or pharyngeal cavities, is the cause of a cold. The infectious origin of a cold is an unproven theory and a theory based upon a false premise because in the early stages of a cold the secretions from the nose are always sterile and the organisms usually regarded as the causative factor are only *secondary invaders* of the latter stages. Experiments, conducted by a number of investigators and including my own, trying to inoculate persons free from colds with the secretions from an individual suffering from an acute cold, were uniformly unsuccessful. Not a single case of a cold contracted through direct inoculation. If direct inoculation is incapable of transmitting the disease from one person to another, how very unlikely that it is capable of being transmitted through droplets or contact and association. It is true that a cold will frequently run through families and through offices where the clerks are closely associated, but this does not prove that a cold is spread by contact with other persons. These individuals, in the home and in the office, are subjected to the same unhygienic conditions of environment, and those conditions are the factors in bringing about an altered metabolism and a systemic disturbance affecting all the fluids and secretions of the body.

The *International Medical Digest,* Jan., 1927, says:

"Summarizing the present knowledge of the bacteriology of common colds, one must say that, as yet, there has not been found any specific organism that can be considered as the etiological factor. The possibility of a filtrable virus as a specific cause for rhinitis is interesting but, up to the present time, the evidence is too conflicting to accept it as a fact."

"It soon becomes apparent that for a proper evolution of the causes for colds, one must go further than the study of the bacteria in the upper respiratory tract."

That is just what I have been doing in my investigation of colds—going beyond the study of the bacteria in the upper air passages and seeking a systemic disturbance of which the syndrome of a cold is only a local manifestation.

Why are colds more prevalent in winter than summer?

Climatic conditions have always been held responsible in some way for colds. Inclement weather conditions—of which the chief are severe cold, dampness, windiness, or sudden change of temperature—are frequently considered the exciting or at least a contributory cause of colds. I do not consider cold, per se, as an etiological factor.

Climatic variations are a contributing factor only so far as they inhibit our normal activities and decrease the utilization of our food which is always in excess of what we normally require. We eat too much and exercise too little in cold weather. Overheated houses and too heavy clothing which interfere with bodily heat dissipation, and thus with normal metabolic processes are two very important factors. Another factor is loss of part of the actinic effect of the ultra-violet rays of the sun because of its southern declination, requiring the rays to pass through a thicker stratum of atmosphere which, especially if smoke-laden, acts as a filter to the rays and materially decreases their chemical action upon the blood, chiefly influencing its calcium content or calcium fixation.

The times of the greatest incidence of colds in our industry are on Mondays, days following holidays, and days following banquets or parties where there is an abundance of good things to eat. I have also observed that colds are very prevalent in our traveling salesmen and others who are on the road a great deal. While traveling there is a decided change in daily routine compared to the one maintained while at home, a proneness to overeat, drink too much alcoholic stimulants, an increased mental strain, irregularity of the bowels, lack of proper exercise, and loss of sleep.

Because of their marked influence in the causation of colds by disturbing the normal metabolic, or tearing down and building up process, I want to stress the following conditions and habits. Fatigue, both mental and physical; overeating; lack of exercise; too little water drinking; and constipation.

In our investigation of constipation we have some individuals who say they are absolutely regular and have a normal bowel movement once or twice a day. Upon investigation, the X-ray showed that they are regular but anywhere from 24 to 36 hours late. So regularity does not always mean the individual is not constipated.

Just a few words about foods. We frequently see in the newspaper, a list of foods which produce an alkaline mash and those which produce an acid mash. In general, that is true, but where you are dealing with acids it is not always true. There is no truer statement than what is one man's food is another man's poison; and what will produce an acid in one individual will produce an alkaline in another. Food is a very complicated problem, much more so than most of us realize. It has to be absolutely individualized.

My investigation and experiments resulted in the conclusion that a cold

is not an infection primarily but a local manifestation of a systemic disorder; namely, a disturbance of the normal alkaline balance or reserve, a mild acidosis or lessening of the "buffer" action of the blood plasma through a decrease in its bicarbonate content.

Treatment: To abort. Sodium bicarbonate or baking soda in teaspoonful doses every two hours for 3 doses. The soda should be dissolved in a lemonade glassful of hot water which can be flavored with lemon or orange or peppermint if desired. The solution should not be concentrated as catharsis may result.

I think a large part of the treatment is due to the water. I always stress a large glass of hot water with the soda, or following it. Sodium bicarbonate tablets of 10 grains may be used. These should be crushed with the teeth before swallowing, and followed by the water.

Most colds begin to manifest themselves late in the afternoon or early evening and the abortive treatment is best given at this time up to retiring. At the time of taking that treatment, the usual meal should be dispensed with, or should consist of milk and some cereal, or soup or broth. If the bowels are constipated, they should not be moved by a cathartic or laxative but the lower bowels should be relieved by a soapsuds enema.

To cure a cold that has advanced beyond the incipient stage the dosage must be sufficiently large and frequent to induce alkalinization and maintain it for at least twelve hours. I usually start with 90 grains as the initial dose and 30 grains every two hours thereafter during the waking hours until the symptoms have disappeared. The nose and throat may be sprayed with a solution of sodium bicarbonate in the strength of one teaspoonful to a pint of water. If the bowels are constipated do not use a cathartic but relieve them by using a soapsuds enema.

The efficacy of the treatment depends upon the production of alkalinization and will fail only when it is not properly carried out. The commonest error is using too small an initial dose. Rather have it seemingly too large.

Prophylaxis is best maintained by eliminating the five principal causes—by guarding against fatigue; eating less; exercising more; drinking more water and overcoming the bad habit of constipation.

The Company Physician, Its Medical Liaison Officer

By JAMES A. BRITTON, M.D., *International Harvester Company*

THE doctors in private practice and the public health officers in any community lead the first line of defense against disease. The industrial physician cannot, except in isolated industrial communities, function effectively

in this capacity. The industrial physician is selected for a particular part of community health service which supplements the work of the private physician and the public health officer, but he cannot in any way replace these physicians and the health officer.

An individual's health is influenced (1) by the general health of the community, (2) by the health and economic status of his family, and (3) by many personal qualities.

The purity of a community's drinking water, the wholesomeness of its food, the effectiveness of its plan for removal of waste, and the rigidity of its supervision of infectious diseases are all factors of extreme importance in determining the health of every individual in the community.

From his family the individual gets certain inherited physical weaknesses or defects; and also inherent in the economic status of his family are many factors which influence his growth and development. For example, his health in adult life depends in a great measure on the kind and quantity of food he receives as a child. The same can be said of the very air which he breathes; hence, his health may be seriously affected by the place in which he lives.

The personal equation also enters largely into the determination of the individual's health. While he may not be responsible in any considerable measure for the mental and physical equipment with which he finds himself provided when he reaches adult life, and while he is not entirely responsible for the opportunities which he may have or the environment in which he lives, he is largely responsible for his personal habits, particularly those things which are fundamental in health.

In addition to all this, there is one factor which we might call "luck"—a factor which is sometimes more important than it would appear to be on casual observation. If, for instance, through an accident the individual is deprived of his home or parents during the formative period of his life, his whole future, including his personal health, may be seriously affected.

While we are accustomed frequently to discuss the problems of industrial groups, we must not forget that an industrial group is a part of the community in which that group exists. The responsibilities and functions of the community are not removed from the individuals making up the group, nor, conversely, is the community relieved of responsibility as to any group of individuals because they happen to be occupied in industry.

There are peculiar health problems limited to industrial workers, such as certain occupational health hazards. There are conditions affecting health which are a part of certain industrial processes; also there are certain health factors which have to do with stress and strain of the common working practice in certain industries. It must be remembered that all individuals subject to these specialized hazards are also subject to all of the health problems

which are common to both the community at large and to the individual outside of industry.

From all this it is easily seen that there is no possibility of separating the problems incident to the health of a group of industrial workers from the problems of the individuals making up the entire community. There is so much overlapping and dovetailing of the various factors involved that any plan for service in relation to these health problems must be conceived and executed as a cooperative effort between the private physician, the community health officer, and the industrial physician.

While it is conceivable that in certain isolated groups, which are almost entirely made up of certain industrial units, a company physician might serve in the capacity of private physician, health official, and industrial physician, this situation rarely occurs ("company town," mining camp, or sawmill), Ordinarily, to have an industrial organization attempt to compete with community medical units is not only poor business but poor practice.

For example, if a large company in Chicago attempted to hospitalize its sick or injured employees in its own hospital to the exclusion of other existing community hospitals, irrespective of the quality of the service rendered, this service would be misunderstood and criticised by the average person in the community. On the other hand, if this industrial establishment made a practice of utilizing the community hospitals of accepted standard and the people generally believed that these hospitals were of high standard, there would be no question raised about the quality of the service provided.

The point which has previously been made that it is impossible for any industry to carry a sufficient number of specialists on its pay roll to meet all of the situations that arise is well taken. While it is perfectly evident that with all of the various ills to which the human body is subject there are many minor things which can be helped by what is really the first aid or emergency service, and that such service can be adequately and satisfactorily maintained for an industrial establishment, those things which require more or specialized service can best be had through regular community channels.

With the modern development of industrial relations practice, sickness prevention, like accident prevention, has received a great deal of attention and will receive more as time goes on. It has been demonstrated that there are certain kinds of service which industrial physicians can give to employees which are of great value. I refer particularly to advice when backed up by careful physical examination. A physical examination, when thoroughly conducted and supplemented by modern laboratory procedures, has been found to be fundamental to any accurate advice which may be given to an employee by a company doctor—or for that matter by any doctor. Such physical examinations, when properly conducted, improve the relation between employer and

employee in that this service helps to solve individual health problems which mean so much both to employee and employer. If, on the other hand, any industrial physician gets into the habit of dispensing advice without physical examination, or without some special means of knowing the condition under discussion, it will only be a short time until the relation of the doctor to the employees of the organization becomes unsatisfactory.

The qualifications of an industrial medical officer must be all of those which are generally accepted as necessary to the successful practice of medicine. In addition, an industrial medical officer, in order to be effective in his work, must not only keep in touch with developments in private practice but must have a cordial relation with the community hospital; he must take part in various community functions which have to do with the understanding and solving of health problems, and in many other things which tend not only to make him an industrial medical officer but an important part of the health plan for the whole community.

In conclusion, then, as indicated by the title of this discussion, the company physician must be medical liaison officer between the industrial group which he represents and the community at large. In order to function properly in this capacity he must know and appreciate not only the peculiar health problems which come up within the industry itself but the health problems which are common to the whole community. He must not only have his contacts and his work among the group which he serves directly but in order to serve it better he must accept his share of community responsibilities and his place in the regularly organized agencies for such community service.

New Developments in the Field of Industrial Medicine

By Dr. Frank L. Rector, *Secretary,*
Conference Board of Physicians in Industry

MOST of the new developments in the industrial medicine field have been pretty well covered in that excellent résumé of operations in the industrial medical work in various organizations in the country. I think I can only emphasize a few of the things that have been said or possibly make them a little more impressive to you.

One of the first things, it seems to me, industry needs to do now (I am not going to preach to you either) is to enter into a campaign, if you may call it that, of self-analysis. The United States Public Health Service, the Metropolitan Life Insurance Company, the Industrial Relations Counsellors, the National Industrial Council Board, and other organizations, have been gath-

ering statistics where they could get them, for the last several years. As a matter of fact, they are only fragmentary. They are not inclusive.

As Dr. Cheyney says, in the treatment of colds it must be an individual matter. In the analysis and finding out what the health and medical problems are in each industry, I think that too must be a personal matter with the industry.

If you people want to know what your production costs are, you don't go to your next-door neighbor, if he is in the steel business and you are in the textile, and try to take some of his findings and apply them to your own work. They won't fit. No more can you take the findings in a textile mill and apply them to a steel mill or metal trades factory because you have different problems; you have different groups of people; you have different working conditions; you have different materials with which you work. So you have very little in common in the various types of industries.

About the only thing you have in common are the individuals who work there, and in that respect I don't know of anything that presents greater variation than a group of individuals. So you don't have much in common.

I think the biggest and most urgent problem is to make up your minds to settle down and find out what the problem is in your own family. If enough organizations do that in the next five years, I think a great many of the problems that are now agitating industrial workers and industrial executives, will be solved. But it must be, as I see it, a study of your own organization, of your own people, of your own problems. You cannot apply those of some other organization.

Another movement that is gaining considerable headway is that of the examination of executives and key men in the industry—a physical examination and health audit.

We have all seen, or many of us have seen, the results that come from neglect of this function in big industries. I think it was in Detroit not so long ago, I remember hearing of an executive in one of the large industries who suddenly arose in a meeting of the Board of Directors and started to preach a sermon. That man had apparently been well, mentally and physically, up to that time. He was immediately placed under medical care and they found that he was gone mentally. He had an old syphilitic infection that had suddenly broken out unknown to his workers and his colleagues up to that time.

In another case a man, the head of the Purchasing Department of a large organization, practically ruined his industry by making foolish purchases of products out of all season and out of all line with prices. Again they found a similar condition in that man's physical and mental makeup.

Those are only two or three examples of what I think we will realize is likely to happen to any industry that does not know the health status of its

executives and its key men. There is an interesting slant on this. You may have heard it before, as to what we call the key men in industry. They may still be in the ranks of the workers, but are being coached, probably unknown to themselves, to take the place of foremen, superintendents, and other executives higher up the line. If those men are suddenly called upon, as they sometimes are, to assume increased responsibilities, they will crack, their health will give way. They will be unable to carry on, simply because they have had disabling conditions, wholly unknown to themselves, and to those above them. So it seems to me it is very important that the men who are in present executive positions, and those who are being coached to take the place of the present executives, should have a very thorough physical and mental examination.

That question of mental examination is one that is assuming increasing importance. I have just had this past year a most interesting experience. I spent it in prison. I am out now, and writing my "memoirs" of a year in prison. I found in making a health survey of the various penal institutions of this country an amazing number of men and women in these institutions who are mentally abnormal. In some of the women's reformatories we find 40 to 60 per cent of them definitely feebleminded. We find in other institutions not more than 25 or 30 per cent of the men who can be classified as mentally normal. They have some abnormality which may not be marked; it may be simply a slight deviation from what we term a normal mentality but it has been, in many cases, a large contributing factor in their social downfall.

As I have seen these more than 100,000 people in the last year, I have been constantly reminded of industrial work and of its similarity to the conditions under which these prisoners work. Not so much the conditions under which they live but the conditions under which they work are very comparable to large industrial groups.

You go into a prison with 2,000, 3,000 or 4,000 people. They are all employed, they are all doing something. You look over that group of men and with all due respect to this audience, I think if you dressed those fellows up in the same sort of clothes we are wearing, they'd measure up pretty well from a casual glance. There are lots of people in prison with no more reason to be there than we outside—we've just been a little more lucky.

We find large numbers of those people who have mental deficiencies. They are mentally abnormal. Some of them are definitely insane. We find the same thing true in such mental examinations as have been made in schools, colleges and elsewhere. We find there is a larger number of mental defects than we have ever realized.

We were all astounded at the results of our investigations in the war

period, the physical and mental examination of the boys who went into the army. You have heard time without number, the statement that not more than 35 per cent of the men who came up for the draft were physically able to bear arms and go through with the military routine. We find that same thing carries right on through all social groups.

So without wanting to be an alarmist at all as to the rapid and fatal deterioration of the human race, I think it is of great importance that the industrial people, particularly, give this matter some consideration and where they have an opportunity with their own employees, executives, key men and others with whom they come in contact, that they should know what is the true physical situation. Today it isn't as it was 25 or 30 years ago. We didn't then have the means of finding out a great many things as we do today. As I see it, it is only a question today of utilizing the methods and resources we have available, and by a rational use of these resources and a rational interpretation of our findings, I am sure that a great deal of good can be done and a great deal of illness and lost time in industry prevented.

This brings up the question of how this shall be done. Mr. Dietz mentioned in his paper[1] the question of a diagnostic service. That has been in my mind for several years as one of the most helpful things industry can do. You are not bringing your industrial medical work in conflict with local medical practice by so doing. If the work is properly organized, as Dr. Britton says, your industrial physician is the liaison officer between the industry and the community; you can be a means of service to the community and the physicians in that community by providing facilities for diagnosis of employees that no single physician in the community would be able to do on account of the expense. A $15,000 or $20,000 investment on the part of the individual physician is a big item; it is nothing on the part of a big enterprise.

I throw out this suggestion if you are contemplating anything of this kind. Make the service, the facilities of your diagnostic equipment, available to the practicing physicians in the community. I venture you will have little opposition and will hear little about the lack of cooperation on the part of industry with the local medical practitioners if you do that thing.

The employment of sub-standard workers is a question that is pretty largely up to the compensation commissions, as to how soon they are going to permit the employment of these workers without unduly penalizing employers. You all know in a great many cases, if a man loses his remaining member, whether it is an eye, arm, leg, although he may have lost the other member before he came to work for the present employer, the present employer is charged with total permanent disability. That, obviously, is a thing that has kept a great many employers from employing people who are physically sub-standard.

[1] Trends in Employee Health Activities. Report of an A. M. A. Committee.

I cannot see any other way out of it than for the industrial commissioners or the state legislators to make some legal provision whereby sub-standard workmen can be employed, provided they are capable of doing the work and have only the loss of one member or some other defect to bar them. The present employer should be responsible only for the injury occurring in his employ.

The problem of extending health work in industry also rests, in a measure, upon the Mutual Benefit associations. In the past, practically all these organizations have devoted their efforts to the payment of a cash benefit in the case of injury, illness or death. I feel, with a great many others, that the biggest service those people can render to their members and the industry in which thy are employed, is to devote at least a portion of their resources and funds to a preventive health program along the lines Mr. Dietz suggested. Try to find out what is wrong with these people, keep them from being sick, keep the physical condition up to as near perfect as possible, so you will have as few benefits to pay as possible. In that way, you will be rendering a much greater service than if you wait until the horse is stolen, as the old saying is, before the stable door is locked.

The present method is a question of simply paying out dollars—a small amount here and there, to people who paid into the fund a certain amount of money and they are justly and rightly entitled to what the Association has for them. It seems to me it would be much better if the Association could be induced to take an opposite viewpoint and work from the standpoint of prevention rather than from that of cure and pay.

Relationships Between Public and Industrial Health Work

By Dr. L. R. Thompson,
United States Public Health Service

IN DISCUSSING relationships between public health and industrial health work, it seems desirable first to have in mind some idea of the scope of industrial health work. In a general way industrial health work may be divided into three broad elements: the first relating to dispensary work and the treatment of injuries; second, to what may be termed individual medical service and the correction of physical defects, and lastly, that which relates to occupational health, and sanitary environment of the worker.

Industrial health work probably began in the treatment of minor injuries and sickness which the worker developed during the course of his daily work. It still remains and probably will remain the first line of contact between the

worker and industrial medicine. The progress of industrial medical work in industry has not remained still. The industrial physician is no longer content with finger wrapping and dispensing of pills. The field of medical and surgical work has developed until it has now taken its place as one of the recognized special branches of medicine. Industrial hospitals have been developed and here and there occupational clinics have been established. In the field of industrial health the progress of medicine and surgery have not been much less important than the advances made in other branches of medical science.

The second element in industrial health work is what I have termed "individual medical service." Industrial medicine deals with group health; individual medical service relates to the health of the individual worker. Through the use of sickness records to determine the nature and character of the sickness which keeps the employee away from work and through the use of physical examination for the detection of physical defects, this phase of industrial health work not only looks towards the cure of conditions and defects from which the worker is suffering but also to the elimination of these causes in the prevention of future absence. It is this phase of industrial health work which has most to do with the promotion of better health for the individual and, in consequence, his increased efficiency for his job. In this instance I remember not long ago looking over the records of one of our foremost industrial physicians and having him point out to me the sickness and disability records of employees which had been kept for years back. These records he had used to study the physical condition of the employees, particularly those who had remained in the company and who were in reality the main support and dependence of the industry. In these cases he has been able to correct many minor and not a few serious physical defects and to make the group as a whole more healthful and consequently more efficient for the work which they performed.

The third element in industrial health work has to deal with the relation of the worker's occupation to his health. This phase of the industrial work has no longer to deal with the treatment of injuries developed in the course of work or with the correction of physical defects and the protection of the individual health but is related entirely to the direct or indirect effect of the occupation or working environment, on the health of those employed in particular occupations. Of all the phases of industrial health work, it is this last field which, although it is undoubtedly the most important of the three, has been the slowest in progress and which is still the most important in its far-reaching effects on industrial health.

The study of occupational diseases is by no means a new subject. Even in the dim records of the past occupation and health have been clearly related. In those days there was little diversification of industry. The worker lived

at the seat of his work and many instances whole communities were devoted to a single type of occupation. It is quite evident, therefore, that any condition of occupation which might affect the health of the workers would be clearly evident in the whole group, so that in these early days of industry, even with the very limited knowledge which they had of the exact manner in which industrial hazards acted, they often had a clear idea of the end effects of such a hazard.

To sum up the scope of industrial health work, therefore, not from the standpoint of a desired ideal, but from that of the field of health activities actually covered, in part or in whole, by many industrial establishments, we find it to consist of: (1) medical service in industry; (2) individual medical service in the care of physical defects; (3) relationship of industrial hazards to the health of the worker.

Public health work in the United States and other countries began in a few minor activities in sanitation, nuisance removal and quarantine efforts against the major epidemic diseases such as plague, cholera, etc., and has progressed until it extends into almost every field of our organized society. These first health improvements were directed towards the most flagrant violations of health laws. Next in the progress came the major problems of sanitation in the provision of safe water and adequate sewerage, with the result that not only have water-borne diseases been almost eliminated in the United States, but, also, other diseases which are not water-borne have also been reduced.

Let us stop for a moment and inquire into the general field of public health work. The major activities into which the work is divided may be classified under the following units: control of communicable diseases; infant hygiene; school health; public health nursing; milk control; tuberculosis; social diseases; mental hygiene; public health laboratories; food and drugs; water control; sewage control; general sanitation; vital statistics, and lastly, industrial hygiene. It needs only a cursory survey of these fields of work to see that to a large extent the activities of our constituted health authorities are directly concerned with maternal, infant, and child health. For these three items, namely, communicable disease control, maternal and child hygiene, and school health surveys approximately 45 per cent of the budget of the health officer is expended, and indirectly the budget relating to public health nursing, milk control, tuberculosis, public health laboratories, and vital statistics (which represent 20 per cent more) is mostly spent towards the same end.

This apportionment of the work of the health authorities would seem a one-sided development but if we look back a few years it was the maternal, infant and child death rates which were responsible for our greatest loss of life.

The application of public health activities to these problems through the

establishment of prenatal clinics; the provision of better medical and hospital facilities for child birth, the follow-up work by public health nurses in infancy, health surveys in schools, and finally, in the development of the correlated activities to which I have referred, have all had their effect. The expected period of life has increased and is increasing from year to year through the prevention of deaths in this first period of life. If in the tremendous advance which has been made in child hygiene the distribution of work in public health has seemed to be one-sided, it must not be understood that public health has not importantly entered the field of industrial health.

No more interesting chapter in health of industry exists than that dealing with the circumstances which led to the betterment of working conditions and the protection of the health of workers through the regulation of working hours.

Up to the beginning of the 19th century the working day which was prescribed by the Elizabethan Statutes of Apprentices was intended to prevent not over-work but idleness and such guild prohibitions for night work were at least partly due to the desire to maintain the high standing of quality for their merchandise.

The treatment of child and female workers was particularly vicious for cities and towns were overwhelmed with pauper children to such an extent that we find parishes compelled to pay as much as 5 pounds or $25 for the purpose of apprenticing out children of the poor. What happened was the terrible misuse of human labor, and out of this came the first health law limiting the hours of labor and providing protection for children. Even in this first law which perceived the disastrous effects of fatigue, there was a recognition of the necessity for the control of sanitation as expressed in the requirement for whitewashing of factories at least yearly and proper ventilation at all times.

The basis for this law is a desire not for betterment of social and economic conditions, but for the protection of the health of the worker. In 1795 Dr. Purceval of Manchester and his associates met and formed themselves into the Manchester Board of Health. Their advice on the most important public health problems confronting them was for the formation of legislation to regulate the hours and conditions of work, and it was these regulations which appear to have been the basis for the law of 1802 and practically all subsequent works on this subject in the years which followed. So important were these recommendations that it is impossible to pass them over without a brief summary: first, children and other workers were recognized as especially exposed to contagious diseases and these diseases not only tended to spread rapidly among them but to the neighborhoods in which they worked; second, large factories were considered as generally injurious to the health of those employed in them, even where no particular diseases prevailed; third,

untimely labor at night and excessive hours in the day impaired health and strength.

From this lowly beginning, decade by decade, public health work has entered the field of industry, not always with the approval of the employer, who at first called it unnecessary interference, and not always with the approval of the worker, who termed it personal interference; but because it was established on the sound principle that in good health lies happiness and industrial efficiency, it has persevered.

At the present time practically none of the industrial states and a few of the others are without sanitary codes for the regulations of cleanliness in factories and for the provision of clean water and adequate sewage facilities. These regulations cover almost every item of sanitary matters, and factory inspection to provide for their enforcement exists in practically every state.

Out of the unromantic study of public health statistics dealing with industrial accidents has come the greatest movement which enforcement authorities—government and state, and both labor and industry—have ever seen, safety first, and accident prevention, and to quote our own and other government and state records, industrial accidents have decreased steadily during the past few years, although this may be contrasted with the steady rise in non-industrial accidents.

Out of accident prevention and medical work in factories have come the compensation laws. These laws first dealt with compensation for injury at work, but injury in industry has a broader meaning than our first law-makers conceived. Health injury is as much related to occupation as is accident injury, and public health studies of occupational diseases have broadened compensation laws to include those diseases which are unquestionably related to occupation.

Out of compensation has come rehabilitation and the provision of the retraining of workers in new jobs where they have been incapacitated to return to the occupation they once followed.

In the rather remarkable achievements which have come from the application of public health methods to specific problems, such as the improvement of infant and child health, is the confirmation of the statement that "Public health is purchasable."

It is not to be understood that there are no public health questions remaining even in the field in which the greatest work has been done, but in the clearing up of these major problems we cannot fail to become more and more aware of other health problems which in the past have been obscured and among which is the important question of adult health. As I have already said, life expectancy has greatly increased in recent years but it is the saving of lives at the early end of life, not at the later end, which has largely made this possible. The span of years which the adult of forty may expect to live

is practically no longer than it was previous to the advances which have been made in public health.

Proportionately, many of the causes of death in the adult population have increased. In the case of cancer, diseases of the heart, cerebral hemorrhage, and a few other diseases there has even been an increase in the death rates.

The proportional increase is clearly accounted for by the decrease in the diseases of childhood, thus giving the adult deaths a greater value. The increase of death rates for heart disease, etc., are not so easy to explain, for apparently they represent a gradual increase either in the severity or prevalence of these conditions. Howeved, these facts point quite clearly to a part of the unsolved problem of adult health.

What seems of more importance is the fact that while we may find a general decreasing death rate for certain diseases in the adult population, we may, on the contrary, find no decrease in certain occupational groups or even a steady increase. Perhaps the best example is found in tuberculosis. In the past 20 years the death rate for this disease in the general population has steadily decreased. In the general male industrial population there has also been a consistent decrease but not quite so great, yet in certain occupational groups (particularly workers exposed to silicious dusts, as in the granite study, which I will refer to later) there has been a steady increase in the number of deaths.

Again, in the study of these occupational mortality rates we find that in not a few occupational groups where there exists a high death rate for one cause, we are quite likely to find high rates for other causes of death which do not appear to be related in any way to the occupation.

These facts appear to be of particular significance. The great importance of adult health as a part of the general public health problem is obvious to all. Quite as obvious is the fact that through the application of better public health methods to industrial health, it should be possible to make the greatest saving in life and that the first line of attack should be the specific occupational diseases.

Scientific research into the various fields of public health is one of the principal functions of the U. S. Public Health Service. The range of this work is quite wide and enters into the problems of zoology, bacteriology, chemistry, pharmacology, epidemiology, the investigations of certain communicable diseases such as Rocky Mountain spotted fever, etc., the study of nutritional diseases, administrative or health department practice, child hygiene, milk, stream pollution, and industrial hygiene.

In the particular field of industrial hygiene we have endeavored to progress along two main lines of work; first, to learn more of the illnesses affecting the general industrial population; second, to study the more important industrial hazards and the diseases which appear to be related to these hazards.

In the past 10 years the U. S. Public Health Service has gathered information regarding industrial sickness. No attempt has been made to confine this information to those industries in which one might expect the sickness rates to be high, but rather an attempt has been made to obtain a diversified group. Out of this information has come,—practically for the first time in this country—a rather clear picture of the nature and severity of the illnesses which keep the average industrial worker away from his job.

Again, and possibly of equal importance as the industrial picture, is the fact that this information covering as it does both male and female, married and single workers, may be considered as indicative of the sickness in the adult population.

The second field of investigation carried on by the Section of Industrial Hygiene and Sanitation relates to the study of industrial hazards and occupational diseases. This work has both an economic as well as a health value.

The same type of industry may exist in many states, yet it needs but the briefest review of the laws of the states to see that the regulations for the control of the health hazards in any particular industry have no common base. Naturally, this results in confusion and inadequate accomplishment. If the requirements in one state are over strict, this reacts unfairly upon the industry in that state from an economic standpoint. In another state where the requirements are lax, there is inadequate protection of the worker. The service which is rendered by the investigations of the United States Public Health Service is in providing reliable information upon which can be based adequate and common sense laws in all states. Let me illustrate by referring to the recent study which we have just finished in the granite industry.

Dusts differ in their effect on the health of workers exposed to them, according to the nature of their chemical composition. Of these dusts, those which contain free silica are the most dangerous, causing the development of silicosis or fibrosis of the lungs, and finally rendering the worker greatly susceptible to tuberculosis. Granite dust is one of the silicious dusts. Since such dusts are unquestionably dangerous, the protection of the workers in the granite industry would at first seem quite a simple matter—eliminate the dust and prevent the health injury. Such a solution, however, is neither feasible nor desirable. The elimination of all of the dust would almost be a physical impossibility, and the cost of accomplishing this end would destroy the industry.

The Public Health Service moved a field unit into one of the centers of the granite industry. For two years observations were made on approximately 1,000 workers, a number of whom had been employed for over 40 years in the industry. The physical condition of these workers was studied, their sickness, condition of their lungs by means of the X-ray, the nature of

their work, the amount of dust to which they were and had been exposed, and finally, the chemical and physical characteristics of the dust itself.

When these data were put together the result was clear-cut. We were able to divide the workers into four groups, according to their occupation and to the amount of dust to which they were exposed.

The first two groups were exposed to an atmospheric dustiness which varied from 30 million to 60 million particles per cubic foot. The third group was exposed to an average of 20 million particles, and the fourth to under 10 million particles per cubic foot.

The study of the sickness and death rates for these four groups gave the solution of the problem. In the first two groups which were exposed to the high dust concentration, the development of silicosis and tuberculosis were shown beyond the slightest question of doubt. In the third group the rates were much lower, in fact there was only a suspicion that harmful effects might exist. In the lowest dust count group both the sickness and death rates were about what one would expect in general industry or in the general population.

We were able to advise that if the atmospheric dustiness was kept under an average count of 10 million particles per cubic foot, it was most unlikely that a health hazard would exist.

The work of the Service goes into every field of industry. It includes the problems of ventilation, illumination, exposure to high degrees of heat, exposure to the fumes of chemicals, which in this age of progress in chemistry are almost daily increased in number, and it includes the fields of physics, medicine, and engineering, yet in all instances the end to which we are striving is always the same,—the reduction of excessive sickness and death in the industrial population, and the better understanding of the great problems of adult health.

The Weekly Group Piece Work System [2]

By ROBERT R. LUNDY, *Supervisor of Layout,*
The Studebaker Corporation of America

BACK in 1920 when the South Bend plant of the Studebaker Corporation was put in operation, it was desired that the shops be operated on a straight day work plan similar to the Ford idea. However, the success of such a plan depends almost entirely on a very large production and as we were making only 150 cars per day, it was found in a very short time that the plan was uneconomical. Consequently it was abandoned. Then straight individual piece work was installed and operated successfully for a number

[2] Presented before a meeting of the Society of Time Study Engineers, Detroit.

of years, during which time certain groups, such as the final lines, were being studied and experimented upon until we arrived at the plan of operating our plants on a daily group piece work system. That is to say, the amount of work performed daily was calculated against daily hours required and an hourly average was arrived at each day. This plan was in effect up to about six months ago. So we started with a day work plan, then went to individual piece work and later to the daily group system and this brings us to our present "Weekly Group Piece Work System."

This weekly group piece work system is not a bonus paying plan and so far the necessity for such a plan is not apparent. It has been in full operation now for about six months and from observations so far it looks as if it will continue without change for some time to come. Each change we have made in our wage payment plan has been better than the one preceding it because each time we have seen our productive costs go down and the earnings of the men go up. When that can be accomplished without any major labor difficulty, we feel safe in saying that it looks as if the Weekly Group Piece Work System will continue indefinitely. Prior to the installation of this Weekly Group Piece Work System an investigation revealed some interesting facts in connection with the cost of time keeping. We found that an average time clerk can handle the time keeping for: 400 Day workers

100 Individual piece workers
or 250 Daily group workers.

The above figures are based on the fact that the time clerk does not extend the hours on the time cards into money. This work is done by girls on comptometers. We had on our payrolls at the time of investigation:

4,000 Day workers ÷ 400 = 10 clerks
3,000 Individual piece workers ÷ 100 = 30 clerks
5,000 Daily group workers ÷ 250 = 20 clerks.

Thus, for a total of 12,000 employees we required 60 clerks or an average of 200 employees per clerk. We further analyzed these figures and found that if we could swing the 3,000 individual piece workers over to daily group we could reduce the number of time keepers from 60 to 42—an increase from 200 to 285 employees per time clerk. However, we were still not satisfied so we went further with our investigation and finally came to the conclusion that if we should use the Weekly Group Piece Work System instead of the daily group, we could reduce our time keeping twelve more clerks, leaving a total of 30 for the 12,000 employees or an average of one time clerk for every 400 men. This would give us a net saving of 30 time clerks or 50 per cent of our original force. After much thought and consideration as to the probable disadvantages to Studebaker employees, it was decided to install the system,

as nothing could be found in the scheme proposed that would work a hardship on the employee, so the saving, as outlined above, namely 30 time clerks, was the goal set. The actual installation started late in April of 1928 and in November of that year we had reduced the number of time keepers by 28 and 5 employees in our Works Accounting and Cooperative Departments, for a total reduction of 33 clerks.

Wherever the weekly group is installed, all employees except the foreman of the department are included in it. Of course every department has men in it who, we think, should receive more than other men in the same department and so we provide for that by setting up craft classes and distinguishing them from each other by letters. Here is an illustration of an actual set up for a department:

Craft	*Class*	*Base Rate*	*Percentage*
Asst. Foreman	A	.75	50% more than F Class
Grinders	B	.70	40% more than F Class
Lathe Hands	C	.65	30% more than F Class
Drill Press	D	.60	20% more than F Class
Slow Operators	E	.55	10% more than F Class
New Men & Day Workers	F	.50	Base Rate

The crafts are arrived at by our base rates and our base rates are the minimum amounts the management wishes the operator to earn per hour while working as a piece worker. The percentage over the base class is necessary in order to calculate the earnings of each class. These classes and percentages are shown on what we call a Departmental Classification Sheet. This classification sheet then acts as a key and a guide to the foreman in classifying his men which he does at the end of every week by marking the operators' time cards either Class A, B, C, D, E or F.

We do not insist upon his classifying the men exactly as we have, by crafts, as who should know better than that foreman which of his grinder hands were producing the best and greatest amount of work. Therefore, instead of classifying all his grinder hands in Class B as the Time Study Department has done for the purpose of time study price setting, he should and would, possibly, classify his best grinder hands in Class B and his poorer ones in Class C, or Class D. Or possibly he may wish to reward a Drill Press operator with a Class C rating instead of Class D, as we have shown, due to his productivity, long service and high grade workmanship.

The foreman, after classifying his time cards, passes them over to the time clerk who in turn sorts them numerically by classes and posts to sheet No. 3—"Weekly Report of Group Piece Worker's Earnings"—the operator's check number and total hours in each class, for sometimes an operator may work in more than one class during the week. He also posts to Sheet No. 1 items No. 12 and No. 14, namely Class A, B, C, D, E and F as well the

percentage—50%, 40%, 30%, 20% and 10%, respectively, that each class is to be paid more than the Base or Class F.

Each part or assembly made in a department has one piece work price for performing all of the necessary operations on that part in that department.

W55T Studebaker

GROUP PIECE WORK LABOR RECORD

INSTRUCTIONS:—Made in triplicate weekly by prod. record clerk from D1803, D1807, D1808, D1817 and covering all piecework labor performed by group. All copies forwarded to Time Office for extension. Original retained in Time Office as authority to pay employees. Duplicate returned to Prod. Record Dept. Triplicate to foreman.

Sheet #1

Plant No.	1
Dept. No.	148
Group No.	1
Week Ending	11-7-28

Group Name CRANKSHAFT GROUP

Shop Order or Account No. 1	Part Number 2	Oper. No. 3	Part Name 4	PIECES PRODUCED 5 Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.	Total	Rate 6	Amount 7
8 3004	14803		Asst. Foreman		9	9	9	9	9	5	50	.75	35.00
9 304	14803		Repair							5	5	.50	2.50
10 601	236740	1-28	Shaft		100	100	100	100	100	100	600	20.00	120.00
11 601	236741	1-30	Shaft		50	50	50	50	50		250	20.00	50.00

Class 12	Actual Hours 13	Percentage 14	Percentage Hours 15	Average Hourly Rate 16	Earnings By Group 17
A	50	50	75	.8250	41.25
B	50	40	70	.7700	38.50
C	50	30	65	.7150	35.75
D	50	20	60	.6600	33.00
E	—	10	—	—	—
F	50	Base	50	.5500	27.50
TOTALS	250		320		176.00

TOTAL PAID ALL EMPLOYEES

Correct

Production Clerk

Earnings Paid Not Included in Net Group Earnings	
Transfers	
Shortages	
Finals	
Loaned Men	
Group Employees Not Posted	
TOTAL	

Group Earnings	
Total Earnings	207.50
Credit or Recharge	31.50
Net Total	176.00

Rates Checked
Extended
Checked
} Time Dept.

SHEET NO. 1. ACTUAL SIZE—8½"x11".

There are no individual operation piece work prices except where a part is finished in one operation and then leaves the department. In other words, there is but one piece work price for each part in a department and that covers all of the work performed by that department.

Each day the time clerk posts from a production report, which is made up at night, to the Group Piece Work Labor Record. (See Sheet No. 1) This posting is of lines Nos. 10 and 11 to items Nos. 1, 2, 3, 4, 5 and 6, namely—account number, part number, operation number, part name, pieces

produced and the rate per hundred pieces which he obtains from the departmental operation sheets as prepared by the planning department.

For employees who do not work on production, such as truckers, machine setters, die setters, wash tank men, repair men, Assistant Foremen, etc.,

D1808 Studebaker

ADJUSTMENT TO GROUP PIECE WORK RECORD

INSTRUCTIONS:—Made in triplicate weekly by production record clerk or Time Dept. from W896, D1807 and D1817. All copies forwarded to Time Dept. for extensions. Credits or Recharges posted to D1807 Original retained by Time Dept. Duplicate to Production Record Dept. Triplicate to Foreman.

Plt. No. 1 Dept. No. 148
Group No. 1
Week Ending 11-17-39

Sheet 2

CREDITS

Shop Order	Part or Clock No.	Oper.	Explanation	PIECES OR HOURS Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.	Total	Rate	Amount
	23671D	1	Inventory								10	20.00	2.00

RECHARGES

Shop Order	Part or Clock No.	Oper.	Explanation	PIECES OR HOURS Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.	Total	Rate	Amount
601	23672L	1-28	Overpay-Inv.								115	20.00	23.00
304	23674 O	10	Spray		10		20	30		40	100	10.00	10.00
300-A	14803		Overpay			1					1	.50	.50

Total Credits		Total Recharges	33.50
Total Recharges		Total Credits	2.00
Net Credit		Net Recharges	31.50

Correct _____ Clerk

Rates Checked _____
Extended _____
Checked _____ Time Dept.

SHEET NO. 2. ACTUAL SIZE—8½"x11".

the department foreman issues a Day Work Permit showing employee's clock number, job and number of hours required for same. The same applies to a no price production job being run. This Day Work Permit is then approved or disapproved by the Time Study Department after which it is forwarded to the time clerk.

The time clerk posts to the Group Piece Work Labor Record the day work rate of the particular man for whom the day work permit was issued

and the number of hours allowed as shown on Sheet No. 1, items No. 8 and No. 9.

The next step is shown on Sheet No. 2—"Adjustment to Group Piece Work Record"—to which all credits and debits or recharges are posted—credits due to under pay for the previous week—recharges due to overpay or for scrap penalties or in case an employee quits, say in the middle of the week—he is paid within 24 hours at the hourly average rate of his class for the previous week. The amount of money paid him is then posted as a recharge against the group.

D1617 Studebaker

WEEKLY REPORT OF GROUP PIECE WORKER'S EARNINGS

INSTRUCTIONS:—Made in triplicate by Production Record Dept. from D1616 or D1617, showing total hours worked by each class. Original to Time Department, duplicate retained and triplicate forwarded to department Foreman. Sheet #3

Plant No. 1 Dept. No. 14a
Group No. 1
Week Ending 11-17-28

CLASS A .8250			CLASS B .7700			CLASS C .7150		
Clock No.	Total Hours	Total Earnings	Clock No.	Total Hours	Total Earnings	Clock No.	Total Hours	Total Earnings
~~14862~~	~~50~~	~~41.25~~	~~14805~~	50	38.50	14801	50	35.75
D .6600			E .6050			F .6500		
~~14804~~	50	33.00	---	---	---	14805	50	27.50

Signed

SHEET NO. 3. ACTUAL SIZE—8½"x11".

Sheets Nos. 1, 2 and 3 are then passed to the girls working with comptometers who total the actual hours worked by each class which is posted to sheet No. 1 under item No. 13. The next step is to convert the actual hours for each class into what we call percentage hours, in accordance with the percentages as shown under item No. 14 where class A's 50 actual hours are increased by 50% to 75 percentage hours and class B's 50 actual hours are increased by 40% to 70 percentage hours, and so on down to class F.

The department's total gross earnings as shown on Sheet No. 1, item No. 7 are then calculated by the girls after which the net credit or recharge is added to or subtracted from the gross earnings to arrive at the net total group earnings. The net total earnings are then divided by the total percentage hours. The resultant figure, then, is the average hourly rate for Class F.

Then, in order to determine the hourly average of each of the other classes, the Class F rate is increased by the same percentages as were used in arriving at the percentage hours for the classes, that is—Class A's hourly average is an increase of 50% over Class F and Class B's hourly average is an increase of 40% over Class F, etc.

We now have the average hourly earnings for each class which, when multiplied by the actual hours for that class, gives us the total earnings for each class which, when totalled, will prove to be in balance with the net total earnings. This proves all computations have been correct thus far.

The hourly average for each class is then posted from Sheet No. 1, item No. 16 to Sheet No. 3 to the respective classes as shown. Each operator's total hours are then multiplied by the rate per hour for the class he is shown in, this being his total earnings for the week. The total of each operator's earnings will also be in balance with the net total earnings for the department.

From here this information goes to the paymaster's office to be made up into checks for the employees.

That concludes the workings of the Weekly Group Piece Work System as operated by Studebaker but there are, of course, a number of contributing records which go to make it a success, such as routing of operation sheets, time study records, etc.

The Weekly Group System is weekly in name only in that it is computed but once a week. It is a flexible, yet strong, system that breeds ambition and initiative in operators and foremen alike. Up until the advent of the weekly group the department foreman was a stock chaser and governor of production in that we gave him his stock to work with, told him when we wanted it and would not allow him to run ahead on a single part. With the weekly group, he runs his production so that he can efficiently juggle his men around, keeping them all busy and interested in getting out the work so that it will pass inspection and they, in turn, receive greater remuneration.

A Vacation Plan Based on Salary Status

By JOHN S. KEIR, *Economist*
Dennison Manufacturing Company

EVERY employee of the Dennison Manufacturing Company is entitled to a two weeks' vacation during each year. The vacations are classified in two groups: (1) those which are granted with pay and (2) those which are granted without pay.

Vacations with pay correlate either with length of service or position in the organization as reflected by salary status. The specific conditions under which vacations with pay are granted are as follows:

1. Employees on monthly salary—2 weeks.
2. Employees on weekly salary—2 weeks unless their total service for the company is less than six months on June 1, when only one week will be given.

3. Employees on hourly basis or piece rate—one week upon the completion of 10 years' service before December 31 if they have been in the employ of the company since January 1; 2 weeks upon the completion of 15 years' service before December 31 if they have been in the employ of the company since January 1.

Among the higher salary groups the rough working plan is as follows:

1. Directors who in this company are full time officials each with a definite organization responsibility—one month's vacation.
2. Other first rank executives—three weeks' vacation.

All of these men, however, come under the care of a consulting physician, who makes periodic physical examinations. The physician in any cases he sees fit, may direct extra summer vacation or shortened hours of work per day. He may also in given instances, direct that extra vacation time be provided during the winter months.

Other points in the Dennison vacation policy are:

1. The vacation period covers the entire year. Any employee may take his regular vacation during the winter months if he so desires.
2. When extra vacation time is needed on account of health, a doctor's certificate covering the case is presented to the management for approval. If approved, the employee is then granted a leave of absence.
3. Employees who have worked for the Company twenty-five years or more are paid for all holidays as well as for the regular vacation period.

In practice, out of the approximately three thousand employees at the Framingham plant, in a given year, all but 257 took a vacation. Of the total group, 856 were paid vacations, divided as follows:

Classification	*Number*
(a) 1 week for 10 years' service	245
(b) 2 weeks for 15 years' service	383
(c) 2 weeks for salaried workers	225
(d) 1 week for workers of less than six months service	3

In addition there were the front line executives in the three weeks and the month class, although these constitute a relatively small group.

An examination of the reasons of those who did not take a vacation brings out some interesting data. A very large percentage stated that they could not afford a vacation, and for reasons that cover nearly the whole range of human motivations. Another large percentage stated they would rather work and earn the money. Another group preferred to take time off a day

at a time throughout the year, than any specified vacation period. Another portion were practically new employees and therefore not eligible; and so the causes ran. Over a period of years, however, the non-vacationers—for whatever reasons—apparently are a decreasing minority.

The Dennison theory of vacations is that vacations are given for the current year to build up the individual for the year to come. The vacation is not regarded as a bonus for attendance during the year, or for attitude or conduct; the theory being that these things should be controllable by management in some other way.

The problem of vacations and of paid vacations particularly is one requiring constant and careful study. In the case of the Dennison Company for example, to drop the paid vacation limit to the five-year group of employees would add thirty thousand dollars a year to a bill that already runs into many thousands. To go beyond that gives costs that are somewhat staggering. And yet in many cases the people who most need a vacation, fail to take one because they feel they need every cent of their week or two weeks' wages. The problem then is to justify the investment by individual companies in paid vacations on the company balance sheet, with the non-vacationers cost on the social balance sheet. It is not a simple problem.

The Sales Bonus Plan of the Leeds & Northrup Co.

By C. R. CARY, *Vice-President in-charge-of Sales*

THE economic trend of the last ten years has rapidly increased the need for intensive team work within sales forces handling industrial equipment.

Previous to the War, it was seldom that the industrial equipment salesman would not find, located within his territory, all the individuals whose approval was required before a purchase of equipment for a plant in his territory could be made. Now there are many lines and many markets in which most of the sales can be effected only after obtaining the approval of various executives, scattered perhaps between New York and California. The executive and staff in charge of production may be in the oil fields of Southern California, the Engineering Department in Chicago and the Purchasing Department in New York. All of these will have to approve of the purchase, yet one group may have greater weight than another and *à priori* no one can tell which. Obviously, it is seldom that the amount at stake is large enough to justify a salesman chasing back and forth across the continent, so the local salesman or representative in each district involved must be called upon to take a hand. But the order, if received, comes from the Purchasing Agent even though, in the majority of cases, he has had to be given the least atten-

tion. However, in the case cited, the order was secured because the sales force in three districts each did its share, but who could appraise, with any accuracy, what each share was? If you cannot do this, you certainly cannot have a smoothly working system of salesman's remuneration based upon the orders received through him or from his district—it would not be fair to credit such an order solely to any one district, yet there is slim chance of making a split without injuring somebody's feelings. If the situation is further complicated by involving one or more distributing agents, instead of your own people, the case becomes positively hopeless. Parenthetically it may be added that because we see no hope in this direction, we are, practically speaking, eliminating local distributors from our scheme of distribution.

Salesman's Individual Performance

So far as I can find out, all writers and speakers upon Sales Management seem to presuppose a condition in which each salesman is called upon to hoe his own row; the only cooperation sought from him is that directed toward the Sales Manager and the firm's policies. This fact manifests itself in that all the salesmen's remuneration plans set forth for public inspection, in any departures from the old-fashioned straight salary, relate remuneration to the salesman's individual performance. No exception can be taken to this stressing of individual performance in building up volume as long as circumstances, under which the salesman acts, justify the assumption that nothing else than sending in profitable orders is sought, but in more lines than engineering equipment this assumption is not justified. Others than myself have seen the ardor of an automobile salesman cool when he discovered that the prospect lived outside his district, while there is at least an even chance that I might now have a different type of electric refrigerator in my home in Philadelphia if a Detroit salesman had had a larger idea of his responsibilities to his concern.

Now when an organization rewards its salesmen along purely individualistic lines, as for instance, through individual sales quotas, or sales contests of one type or another, it is only to be expected that those men will each concentrate all of his energy upon building up his own total. He will at best give lackadaisical attention to work which he might do for the good of the company but without effect upon his total. Also he will thoroughly resent being asked to share anything which he has the slightest ground to believe was obtained as the result of his labors. I have, however, the greatest respect for these various direct individual incentive methods. I am sure that something of this type is absolutely necessary to get results from the naturally lazy, while at the same time it is a great stimulant to the ambitious and energetic. Doubtless in that great field of distribution of consumption goods and household equipment to the general public, the advantages of the direct individual

incentive far outweigh its disadvantages. The analysis, however, of our problems which we attempt always to keep open, ready for revision in the light of changed conditions and newer facts, has guided us steadily away from the individualistic and toward a group system of remuneration for our sales force because of the increasing need for group efficiency.

Success Through Team Work

We were started in the direction of a group system in the very early days of our business when there were only two or three of us selling. We were then, as we are now, selling electrical measuring apparatus to a highly intelligent section of the community—college and technical research staffs. Our line was even then so extensive that no one man could hope to become expert in it all, yet each of our customers expected us to be able to discuss the fine points of his problems and of the equipment he needed. We met this situation reasonably satisfactorily by requiring each of our number to make himself expert along certain lines and then, when any one of the rest of us found himself getting beyond his depth, he would call in the man who specialized in that particular side of the line. The successful pursuit of such a practice demands team work of quite a high order, since it can be successful only when there is great mutual respect and full mutual confidence. As I look back upon the twenty years during which I have seen this type of team work in operation, not only am I sure that it has been notably successful in the building up of our business but I am equally sure that we could not have been equally successful under an individualistic system even though the latter conceivably might have spurred our group on to greater individual exertion. Incidentally, because of this background, we found ourselves well situated to meet that more recent need to which I referred in my introduction—the team work required in selling to nation-wide organizations. Our troubles in meeting this need arise only at those few points where, by the introduction of resale houses, we have introduced an element which is inherently incompatible with whole-souled team work.

Inasmuch as such a large proportion of our sales involved collaboration on the part of various members of the sales force, we have never attempted any individualistic remuneration scheme. We have always worked remuneration plans which combined a straight salary with a yearly bonus, varying in amount with the success of the group.

We have, at present, a force of sixty men to guide and provide for. Of these, about one-half have either been with us less than the two years required to qualify for membership in the bonus group or do not have the kind of duties which justify inclusion in the group. Rather unusual conditions are prevailing with us at present—otherwise probably two-thirds to three-quarters would share in the bonus. Roughly, one-half of our force works with our

home office as headquarters, and the rest are distributed among our branches in Chicago, Cleveland, Detroit. Apart from this geographical distribution, the Department is divided into three divisions, each in charge of a Sales Manager. One division, the root stock of the tree, handles our General line of electrical measuring instruments, a second covers temperature measuring equipment, and the third, our metal treatment furnaces. Not only must there be a great deal of cooperation between the men within a given division, but there is need for a considerable amount between the different divisions. As has been indicated, we, in large measure, depend upon a departmental bonus system to secure this cooperation. The operation of this system is as follows:

Preparing the Budget for New Year

At the beginning of each fiscal year, a budget is prepared for the forthcoming year on the basis of which an anticipated profit and loss statement, as of the end of the year, is drawn up. After deducting from the anticipated taxable profits sufficient to meet preferred dividend requirements and a 6 per cent common dividend, the company is accustomed to divide the remainder, after federal taxes have been deducted, between common stock and bonus to the executive group, the sub-executive group and the Sales Department. Armed with this knowledge of the anticipated amount available, the three division heads and I retire to Atlantic City, where, free from distractions, we thresh out salaries and bonus distribution for the coming year. The three division heads have each previously consulted his lieutenants with regard to the performance of the rank and file of the present group and the qualifications of prospective members, so that each has the personnel of his own division well related as to calibre with respect to each other. At our week-end meeting, we adjust the three lists, each to the other, so that individuals of equal calibre in the three divisions are placed upon the same level. Because the dollar mark is the most convenient unit, it is used in this rating, and compared with the salary list the bonus list grades much more steeply upwards. The total of these dollar ratings should equal the anticipated bonus fund, and when it does not the individual bonuses are all scaled accordingly to bring the total into line. This procedure takes care of all participants in the sales bonus except those participating in the conference, whose bonuses are fixed by the Executive Committee of the Company. When the schedule, thus prepared, has received the approval of the Executive Committee, each participant is given a curve relating the bonus he will receive at the end of the fiscal year to the taxable profits the company may earn. This curve is a straight line, beginning at zero when taxable profits meet dividend requirements plus taxes and passing through the man's rating figure when taxable profits correspond to the anticipated. As we have a monthly issue of the profit and loss figures, each bonus participant is given monthly a statement of taxable profits to date,

from which, with the data of his curve, he can keep track of his probable bonus.

It will be observed that this procedure involves two main principles: (a) method of setting up the bonus fund and (b) the method of distributing it. We have made use of (b) for over a decade, about which time it had evolved itself from a period when there were only two participants. Factor (a), the method of setting up the fund, has been shifted a number of times—the present scheme is in its third year. Previous methods employed in factor (a) attempted to relate the magnitude of the fund to the efficiency of the department as a Department; and among the causes which led to the adoption of the present profits basis was the desire to make an absolute community of interest between the Sales Department, the other Departments and the stockholders. From such community of financial interest, only, can whole-souled cooperation between different groups be secured.

As a unifying influence and inspiration to whole-souled team work we are thoroughly satisfied with the success of our plan, not only within the Sales Department where the team spirit predominates and there is a gratifying scarcity of petty jealousies, but also in its effect upon the relations of the salesmen with members of other branches of the company. Our men are happy under the plan and fully appreciate the advantages which flow from it, but they quite cheerfully concur with me in questioning whether we get as intensive work out of each individual as would be the case were we operating under the effect of some more direct sales incentive.

Appraisal of the Individual on Current Merits

In the appraisal of the various individuals for their bonus rating, there is a considerably greater amount of freedom to appraise the individual on his own current merits. While the effect of extraneous elements such as market wage and previous standing, etc., are not eliminated they are greatly reduced. Furthermore, a greater latitude of adjustment is available since, in practice, the bonus rating at the beginning of the year varies from zero for some up to an amount practically equal to the salary of the individual for others. The salaries paid are relatively modest, but we are confident that the sum of salary plus bonus provides a much more liberal income than the company could afford to sustain were it paid out as salary.

This yearly appraisal with its elastic results, following the judgment passed upon him not only by his immediate superior but also by those in collateral lines, together with the more or less direct influence of the opinions of his own side-partners, certainly is an incentive which is never far from the minds of all. Furthermore, the exercise of the right spirit, judgment and discretion by junior executives in their appraisals of the rank and file is at once excellent training for them and a valued gauge of their own calibre.